02910.103293.1 PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	Examiner: Peter L. Vajda
TADASHI DOJO, et al.	)	Art Unit: 1721
Application No.: 10/577,148	)	Confirmation No.: 3336
Filed: April 26, 2006	)	
For: MAGNETIC TONER	)	

Commissioner for Patents
P.O. Box 1450
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DECLARATION UNDER TITLE 37 C.F.R. § 1.132

Sir:

I, Tadashi Dojo, declare that:

1. I reside in Takashima-Cho, Numazu-shi, Shizuoka-ken, Japan.

2. I have received an undergraduate degree from the Tokyo Technical University, Department of Technology, in March of 1990, and graduated from the Special Study Course of Chemical Technology at the University (Master's Course) in March 1992.

3. I have been working at Canon, Inc. from April of 1992 up to the present.

4. I am the inventor in more than 25 U.S. patents of Canon, Inc. (the Assignee).

5. I am an inventor of the subject patent application and am familiar with the prosecution history of the subject patent application.

6. I conducted the following experiment (or had the following experiment conducted under my supervision and control).

I. Preparation of Toner A

After-mentioned binder resin (1) : 30 parts by mass

After-mentioned binder resin (2) : 70 parts by mass

Magnetic iron oxide : 90 parts by mass

(average particle diameter : 0.20μm, Hc : 9.6kA/m, σs : 83Am^2/kg, σr : 13Am^2/kg)

Sulfonate group-containing polymer : 2 parts by mass

(polymer comprising styrene, 2-ethylhexyl acrylate and 2-acrylamide-2-methylpropane sulfonate, Tg: 78°C, Mw : 32000)

Organic aluminum compound : 1 part by mass

(compound comprising di-t-butylsalicyl acid and aluminum)

Hydrocarbon-based wax : 5 parts by mass

(melting point : 105°C)

A mixture of the above raw materials was melted and kneaded by means of a biaxial extruder heated to 130°C, and was then cooled. The cooled mixture was coarsely pulverized by means of a hammer mill. The resultant coarsely pulverized pieces were finely pulverized by means of a Turbo mill (manufactured by Turbo Kogyo Co., Ltd.). The resultant finely pulverized pieces were classified by means of an air classifier to produce magnetic toner particles having weight-average particle diameter of 7.5μm.

100 parts by mass of the magnetic toner particles were externally added with 1.2 parts by mass of hydrophobic dry silica (BET specific surface area of 170m^2/g) by means of a Henschel mixer, to thereby produce a toner A. Property of the obtained toner A was shown in the following Table.

Furthermore, the measurement result of tandelta (tan δ) of the obtained toner A was shown in the following Fig.1. In Fig.1, the curve indicated by "90 parts - 100kHz" shows tandelta of toner A.

It should be noted that the above-mentioned binder resins (1) and (2) were prepared by the following method.

Polyester monomers (terephthalic acid, trimellitic acid, dodecenylsuccinic acid, propoxylated bisphenol A and ethoxylated bisphenol A) and an esterification catalyst were fed into a four-necked flask, a pressure reducing device, a water separating device, a nitrogen gas-introducing device, a temperature measuring device, and a stirring device were attached to the flask. While the mixture was stirred at a temperature of 130°C in a nitrogen atmosphere, a mixture of the vinyl copolymerizable monomers (styrene, 2-ethylhexyl acrylate and acryl acid) was added dropwise from a dropping funnel. The vinyl copolymerizable monomers were polymerized at a temperature of 130°C, and then the temperature of the resultant was increased to 230°C to carry out a condensation polymerization reaction. The condensation polymerization reaction was performed with measuring a softening point, and finally, the binder resin (1) having the softening point of 96°C, acid value of 30mgKOH/g and glass transition temperature of 56°C was obtained.

Similarly, polyester monomers (terephthalic acid, trimellitic acid, dodecenylsuccinic acid, propoxylated bisphenol A and ethoxylated bisphenol A) and an esterification catalyst were fed into a four-necked flask, a pressure reducing device, a water separating device, a nitrogen gas-introducing device, a temperature measuring device, and a stirring device were attached to the flask. While the mixture was stirred at a temperature of 130°C in a nitrogen atmosphere, a mixture of the vinyl copolymerizable monomers (styrene, 2-ethylhexyl acrylate and acryl acid) was added dropwise from a dropping funnel.

The vinyl copolymerizebla monomers were polymerized at a temperature 130°C, and then the temperature of the resultant was increased to 230°C to carry out a condensation polymerization reaction. The condensation polymerization reaction was performed with measuring a softening point, and finally, the binder resin (2) having the softening point of 140°C, acid value of 18mg/KOH/g and glass transition temperature of 60°C was obtained.

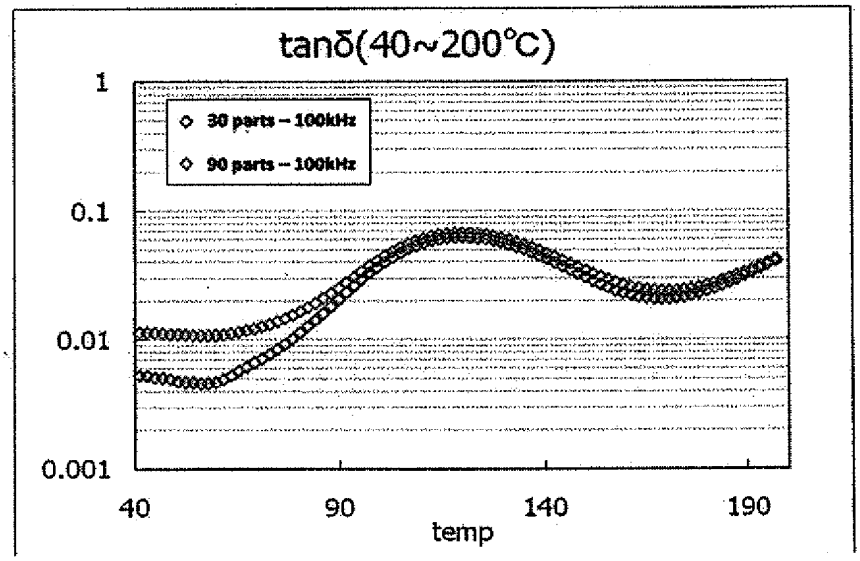
II. Preparation of Toner B

Magnetic toner particles having weight-average particle diameter is prepared in the same manner as the method for preparing the above toner A except that the magnetic iron oxide added is 30 parts by mass.

100 parts by mass of the magnetic toner particles were externally added with 1.2 parts by mass of hydrophobic dry silica (BET specific surface area of 170m^2/g) by means of a Henschel mixer, to thereby produce a toner B.

Furthermore, the measurement result of tandelta (tan δ) of the obtained toner B was shown in the following Fig.1. In Fig.1, the curve indicated by."30 parts - 100kHz" shows tandelta of toner B.

	Average weight particl diameter (μm)	Ratio of particles each having a circularity of 0.93 or more (%)	True specific gravity (g/cm^3)	Saturated magnetization (Am^2/kg)	Glass transition point (°C)	tan δ_H	tan δ_L	(tan δ_H - tan δ_L) / tan δ_L
Toner A	7.5	68	1.8	39	58	1.20×10^{-2}	1.12×10^{-2}	0.07
Toner B	7.5	62	1.44	20	58	6.30×10^{-3}	4.98×10^{-3}	0.27



As shown in the above Table, as for the toner A, its true specific gravity and saturation magnetization was out of the range defined by the present claims of the subject application. Further, as for the toner B, its value of tandelta does not meet the condition defined by the present claims of the subject application.

Furthermore, in the measurement of the tandelta of these magnetic toners, the tanδcurved line does not become a symmetrical form about the temperature of Tg (58°C) as shown in Fig.1 of JP 06-118700 (Tsuyama).

III. Considerations

Toners A and B, as described above, each have a structure similar to that of the toner described in JP 2002-341598 (Matsunaga). It should be noted that these toners are not identical to the toner described in the Example of Matsunaga. However, these toners have structures closer, but not identical, to the structure of an example embodiment of the present claims of the subject application than to the structure of the toner described in Matsunaga.

(In order to faithfully perform a double-checking of the Example of Matsunaga, the experiment should start from resin synthesis, collecting raw materials, etc., that require an extremely large amount of cost and considerable length of time. Therefore, the experiment was performed by using the resin and raw materials available from our stock.)

Toners A and B and the toner described in the Example of Matsunaga are different from one another in the kind of binder resin contained in each toner, but their prescriptions, the production methods and the like, are substantially the same. In the toners described herein, a hybrid resin is used for the binder resin, while in the toner of the Example of Matsunaga, a polyester resin is used.

Note that as shown by the comparison made between the magnetic toner 7 (using the polyester resin) and the magnetic toner 12 (using the hybrid resin) described in the present specification of the subject application, with the hybrid resin used as the binder resin, the value of $(\tan\delta_H - \tan\delta_L)\tan\delta_L$ tends to become smaller, thereby the use of hybrid resin makes it easier to satisfy the requirements of the present claims of the subject application.

IV. Conclusion

As shown by the results described herein, toners A and B do not meet the limitations of the present claims of the subject application. Since toner A has a large amount of the magnetic body, the values of true specific gravity and saturation magnetization in the magnetic field 796kA/m do not meet the limitations of the present claims of the subject application. Further, toner B was produced by simply reducing the amount of the magnetic body from the prescription of toner A, and it is noted that toner B does not satisfy the limitation of tandelta specified in the present claims of the subject application.

In addition, as shown by the tanδcurved line described herein, when the tandelta of toners A and B was measured at the frequency 100kHz, it was confirmed that the tanδcurved line did not make a symmetrical form about the glass-transition temperature as a reference.

Namely, in the measurement of the tandelta of the magnetic toners at 100kHz as the measuring frequency, the finding that the tanδcurved line becomes a symmetrical form about the glass-transition temperature as a reference, as shown in Fig. 1 of Tsuyama, is not correct. Thus, it is respectfully submitted that the shape of the tanδcurved line shown in Fig. 1 of Tsuyama cannot be applied to the tanδcurved line of the magnetic toner measured at the frequency 100kHz.

It is therefore respectfully submitted that the present claims of the subject application recite subject matter that would not have been anticipated by or obvious to those of ordinary skill in the art at the time of the invention.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Subscribed this 27th day of July – 2011
(Month - Year)

Tadashi Dojo
(Declarant's Name)